

Does Language Matter in the Mathematics Classroom for Orang Asli Students in Malaysia?

Abdul Hakim Abd Jalil^{1*}, Abdul Halim Abdullah², Mohd Hilmi Hamzah³

¹School of Education, Faculty of Social Sciences and Humanities, Universiti Teknologi Malaysia (UTM), 81310 Johor Bahru, Johor, Malaysia.

Email: abdulhakimabdjilil@gmail.com

²School of Education, Faculty of Social Sciences and Humanities, Universiti Teknologi Malaysia (UTM), 81310 Johor Bahru, Johor, Malaysia.

Email: p-halim@utm.my

³School of Languages, Civilisation & Philosophy, Universiti Utara Malaysia (UUM), 06010 Sintok, Kedah, Malaysia.

Email: hilmihamzah@uum.edu.my

ABSTRACT

Numerous studies have shown that the language barrier may cause the difficulties among indigenous children in learning mathematics. Apparently, this is also the case among the Orang Asli students in Malaysia. As enshrined in the Malaysian Constitution, the Malay language is the national language spoken by Malaysians who are made up of various races. However, other races including the Orang Asli are free to use their respective languages in their daily lives. In the Malaysian education system, the medium of instruction used in mathematics classes is the Malay language. Since the Orang Asli students are only exposed to the Malay language after they enter formal education in a primary school, the use of the Malay language has become an obstacle for them to understand mathematical concepts. Accordingly, this concept paper discusses the position of the Orang Asli language in Malaysia, the medium of teaching and learning in mathematics classes in Malaysia, and the effectiveness of using the Orang Asli language in mathematics classes among the Orang Asli students. In addition, the code-switching approach that is widely practised in many countries is also discussed. Finally, the roles of various parties, including the Ministry of Education, the Department of Orang Asli Development, NGOs, teachers, parents and the Orang Asli communities in increasing the use of the national language among the Orang Asli students are also discussed. It is hoped that this concept paper can enlighten the language problems among the Orang Asli students in Malaysia and further improve their academic quality.

CORRESPONDING

AUTHOR (*):

Abdul Hakim Abd Jalil
(abdulhakimabdjilil@gmail.com)

KEYWORDS:

Mathematics Education
Orang Asli's Education
Indigenous Students' Education

CITATION:

Abdul Hakim Abd Jalil, Abdul Halim Abdullah, & Mohd Hilmi Hamzah. (2023). Does Language Matter in the Mathematics Classroom for Orang Asli Students in Malaysia?. *Malaysian Journal of Social Sciences and Humanities (MJSSH)*, 8(2), e002061. <https://doi.org/10.47405/mjssh.v8i2.2061>

Contribution/Originality: This study investigated the connection of language problem as one of the major factors contributing towards the poor performance in Mathematics subject of orang Asli students in Malaysia. Therefore, this study adds to the understanding and information related to the issues in Orang Asli education.

1. Introduction

Malaysia is a multi-ethnic nation. The Malays make up around half of the population, with the minority coming from the Chinese, Indians, and the Orang Asli communities. The Malay language serves as the nation's official language, while English is widely used as a second language. However, other ethnic groups have their own unique languages, customs, religions, and lifestyles. Due to the country's multiple ethnicities, the Malaysian government introduced a national language as a means of cross-cultural communication and as a national identity ever since the country gained independence from the British in 1957.

Orang Asli is one of the various communities in Malaysia. Most modern societies view the Orang Asli community as separated and isolated from the country's mainstream development. In general, there are three main groups of Orang Asli in Peninsular Malaysia namely the Negrito, the Senoi and the Proto Malays who are distinguished through language, culture, way of life and physical characteristics. One of the ongoing problems among educators is the school dropout among the Orang Asli students. The results from the 2009 Primary School Assessment Test (UPSR) showed that more than 60% of the Orang Asli students do not reach the minimum level in English, mathematics and science (Md Nor et al., 2016). For the Malay subject (comprehension and writing), 42% to 53% of Orang Asli students do not reach the minimum level. According to Nordin and Wahab (2021), the communication between teachers and students is one of the obstacles in the teaching and learning process in the classroom. Some students are unable to understand the lessons delivered by non-Orang Asli teachers in the Malay language. Most Malay teachers also have difficulties in understanding the native language of the Orang Asli.

The production of meaning in the classroom depends heavily on a language. According to Garcia, Bartlett, and Kleifgen (2007), a classroom is a place where students from various linguistic origins come together, interact in two or more languages, and attempt to make sense of what they comprehend, know, and do. Both teachers and students are continually conversing in class (González Garca, 2010). Mathematical learning, in particular, requires both formal and casual types of oral communication. Learners negotiate the meaning of mathematics by expressing and conversing about the mathematical concepts with others. The students' primary language usually serves as a foundation for interaction between students and their teachers. Accordingly, this concept paper discusses the position of the indigenous language in Malaysia, the intermediate language in mathematics learning in Malaysia, the effectiveness of the use of the indigenous language in mathematics learning, the use of code-switching in mathematics learning for the Orang Asli students, and the ongoing efforts to help the Orang Asli students in mastering the national language in learning mathematics.

2. Position of Indigenous Languages in Malaysia

Language is a medium used by a community to communicate with each other for the purpose of conveying and receiving information in daily life. Each language has its own advantages and privileges that can provide its own knowledge and benefits to all communities. In Malaysia, the Federal Constitution defends the Interests of the Malay Rulers, the Malay Nation, Bumiputera, Sabah Natives and Orang Asli as well as other matters, as stipulated in Article 153 of the Federal Constitution, the Social Contract Principle and the Constitution of the States in Malaysia. Article 152 of the Federal Constitution explains that the Malay language, also known as Bahasa Malaysia, is the

official language whose function and role as the National Language cannot be disputed. The position of Malay as an official language was strengthened by the National Language Act 1967. Its importance as a language of knowledge and as a medium of teaching and learning has led to the publication of the Education Act 1961 (Amendment 1996). However, the multiracial community in Malaysia, including the Orang Asli community, is free to use other languages including their own mother tongue.

In addition, Article 160 of the Federal Constitution defines "Orang Asli" as the Orang Asli of the Malay Peninsula (an aborigine of the Malay Peninsula). Section 3(1)(a), (b) and (c) of the Orang Asli Act 1954 [Act 134] ("Act 134") provides a more specific definition of the "Orang Asli", as follows:

- “(a) any person whose father is a member of the Orang Asli ethnic group, who speaks the Orang Asli language and habitually follows the Orang Asli way of life and the customs and beliefs of the Orang Asli, and includes a descendant through the male line of that person; or
- (b) any person of any race adopted as an infant by an Orang Asli who has been brought up as an Orang Asli, habitually speaks an Orang Asli language, ordinarily follows the Orang Asli way of life and the customs and beliefs of the Orang Asli and is members of an Orang Asli community; or
- (c) a child from any union between an Orang Asli woman and a man from another race, provided that the child habitually speaks the Orang Asli language, habitually follows the Orang Asli way of life and the customs and beliefs of the Orang Asli and is still a member of an Orang Asli community.”

Based on the definition above, it clearly shows that even though the Malay language is the national language in Malaysia, the language of the Orang Asli community will be continuously preserved and practised by the community. As a Member State to the Convention on the Rights of the Child (CRC), indigenous children cannot be denied the right to enjoy or practise their own culture as well as to profess and practise their religion or use their language. In Malaysia, [Omar \(2014\)](#) estimates that there are well over 100 different languages. Later, [Eberhard, Simons, dan Fennig \(2019\)](#) state that there are 133 living languages spoken in Malaysia with 112 indigenous languages and 21 non-indigenous languages. As mentioned in the United Nations Declaration on the Rights of Indigenous Peoples (Article 13), the indigenous communities are allowed to protect their heritage and tradition, including their languages. The Orang Asli communities in Malaysia are divided into three groups, namely the Negrito, the Senoi, and the Proto Malays, with each group consisting of six tribes. Each of these tribes has its own language and tradition. The spoken language of the Orang Asli can be categorised into two types, which are Austroasiatic and Austronesian languages. The Orang Asli communities who speak Austroasiatic languages are the Negrito and the Senoi who live from the coast to the mountains. The Orang Asli who speak the Austronesian language are the Proto Malays who occupy the areas near the coast and the islands. However, [Benjamin \(2009\)](#) concluded that there are only three groups of Orang Asli languages, which are Northern Aboriginal, Central Aboriginal and Southern Aboriginal languages. The North Native language is spoken by the ethnic groups in the category of Negrito tribes, the Central Native language is spoken among the Proto Malay tribes. This view is used by the Department of Orang Asli Development (JAKOA) to categorize the Orang Asli community as a whole. According to [Hamzah, Halim, Bakri and Pillai \(2022\)](#), language documentation on the Orang Asli

communities in Peninsular Malaysia is extremely limited and thus warrants further investigations.

In addition, the 1989 Convention on the Rights of the Child was ratified by Malaysia in February 1995. The rights of children stated in this convention also cover the education problems among the Orang Asli children. Article 29 places an emphasis on the Education Goal which is "Education shall have the goal of developing the personality, talent and mental and physical abilities of children at the highest level of potential. Education should prepare the child for an active adult life in a free society and foster respect for the child's parents, his own language and values, and for the cultural background and values of other people". Article 30 relates to the Rights of Minority Children or Indigenous Peoples which is "Children from minority communities and Indigenous people have the right to enjoy their own culture and practise their own language and religion" (SUHAKAM, 2010). Accordingly, it is clear here that the Orang Asli students have the right to use their language without affecting the position of the Malay language as the national language.

3. Language of Instruction in the Mathematics Classroom in Malaysia

Throughout the history of the mathematics curriculum in the Malaysian primary and secondary schools, the policy of language use in the teaching and learning of mathematics is inconsistent. In Malaysia, the medium of instruction was the Malay language from the early development of the mathematics curriculum until the Teaching and Learning of Science and Mathematics in English (PPSMI) was introduced in 2003. When PPSMI was introduced, the subjects of science and mathematics were taught in English. It was implemented in stages, starting in the school session of 2003 with the pioneers being all students in Year 1 for the primary school level, and Form 1 and Form 6 for the secondary school level. The full implementation of PPSMI began in 2007 for the secondary school level, as for the primary school level, it started in 2008. However, it was found that:

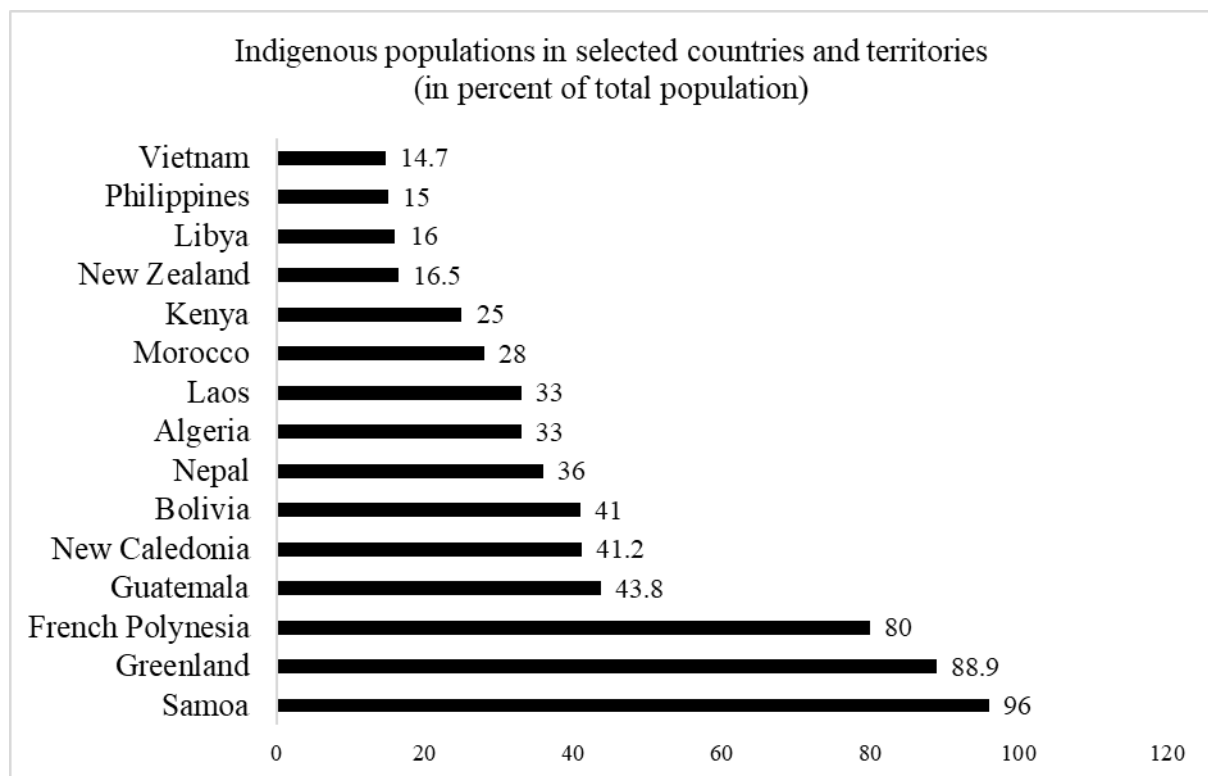
- a) PPSMI caused a double loss to the students, especially those students (75%) who belong to the medium and weak categories in the achievement of the three subjects involving English, science and mathematics.
- b) PPSMI failed to boost the students' interest and enthusiasm in learning science and mathematics at the elementary schools.

According to Talib and Muslim (2007), 70% of the students stated that they had difficulties understanding their science and mathematics teachers. Furthermore, their performance in mathematics tests is also low, especially in the problem-solving items that require them to read the instructions in English. For the January 2008 cohort, the mean score was 7.89 out of a maximum score of 20.0. This weakness was particularly evident among the Malay students and the Orang Asli students, compared to Chinese and Indian students. Based on The Malaysian Insight Report (2020), when PPSMI was carried out from 2003 to 2010, there was an 80% decline in learning in both primary and secondary schools until the government had to cancel it in 2011. Rural students, especially the students from the Orang Asli communities, faced great difficulties from the implementation of PPSMI due to the limited use of English in their daily lives. PPSMI was one of the most important issues in teaching mathematics for all teachers in Malaysia. Largely, this was due to the language as a communicative medium. This language barrier made the communication between teachers and students rather difficult. In addition, one of the reasons why the students' interest in STEM is declining is the uncertainty of language-related policies that are constantly changing. At the same time, these policies and programmes do not improve the quality and mastery of English among students. Therefore, in 2010, the Ministry of

Education decided that the Upholding the Malay Language and Strengthening the English Language Policy (MBMMBI) should be implemented in stages after PPSMI was abolished. In the transition process, the schools could use English and/or other media of instruction (Malay, Mandarin or Tamil) in the teaching and learning of science and mathematics. Currently, the medium of instruction in the Malaysian public schools, including the Orang Asli schools, is Malay. However, in the Chinese and Tamil national-type schools, the instruction is delivered in Chinese and Tamil, respectively. Since 2016, some selected schools have participated in the Dual Language Programme (DLP) that provides the instruction in English for the teaching of science and mathematics.

The same situation occurs in other countries. Figure 1 shows the percentage of the indigenous populations compared to the total population of some countries in the world. As much as 28% of the entire population in Morocco comes from the indigenous people, while as much as 16.5% of the entire population of New Zealand are indigenous people. However, Arabic is the primary language of instruction in Morocco. In primary schools, children are exposed to French as a second language. Since 2019, mathematics and science classes are gradually conducted in French to students in Grades 7-9. For the students in New Zealand, there are three language instruction options: English, Mori, or Pacific. Since 2019, the instruction in a Pacific language is provided to 1.7% of primary school students and 2.6% of students across all schools (most often Samoan). A subject-specific language instruction is not made available to the general public.

Figure 1: Indigenous populations in selected countries and territories



(Source: Buchholz & Richter, 2022)

4. The Effectiveness of Using Native Languages in Mathematics Learning

Language plays an important role in building a relationship. The Orang Asli students enrol schools using their native language as well as one or more Orang Asli languages or a

combination of these. Teachers who want to engage their students at a basic level need to have a functional knowledge of the Orang Asli language. [Md-Ali et al. \(2021\)](#) found that there are two main themes, i.e., classroom and school challenges, in determining mathematical competence among the Orang Asli students. The classroom challenge consists of five sub-themes, namely the coverage of the mathematics syllabus, mathematics teaching and learning resources, student involvement, language constraints, and mathematics learning culture. [SUHAKAM \(2010\)](#) found that (1) the Orang Asli students prefer to study with the teachers who can speak their language, (2) the Orang Asli students are unable to understand their teachers because of the language problems (Malay is the second language for these students), and (3) teachers are unable to speak in the Orang Asli language to facilitate a two-way communication and an effective communication especially for elementary school students. A large number of the Orang Asli students in Grade 1 stated that they are unable to understand their teachers because they do not understand Malay.

According to [Md-Ali et al. \(2021\)](#), the Orang Asli students usually find it difficult to deal with the linguistic density of long items in word math problems, especially when the items are in a language which they are not familiar with. The Orang Asli students also use basic arithmetic operations to solve sums in a symbolic form. In addition, they have difficulties in solving math problems that consist of many words. Therefore, they view mathematics as a difficult subject and they usually obtain unsatisfactory results in this subject ([Md-Ali et al., 2021](#)). According to [Sani and Idris \(2017\)](#), when mathematics is assessed in an academic language in which students have limited proficiency, their classroom performance is greatly affected. Accordingly, efforts should be focused on improving language skills in mathematics classes. The integration of mathematics and language learning simultaneously can create a meaningful learning environment. [Norwaliza and Ramlee \(2015\)](#) found that the Orang Asli students face difficulties in understanding their teachers because some of them are not proficient in Malay.

Furthermore, the teachers also struggle to explain some terms to the Orang Asli students. In this context, [Velloo et al. \(2021\)](#) examine the achievement of the Orang Asli students in mathematics in a bilingual version of a mathematics test (Malay and Temiar). Both tests, based on mathematical calculations and word math problems, consist of three main topics, namely Number, Money, and Time Operations. Their study involves eight Orang Asli primary schools in the Sungai Siput district, Perak. The difficulty index was used to measure the students' achievements in mathematical calculations and word problem items in both Malay and Temiar languages. The findings show that the Orang Asli students face more difficulties in answering the topics of Number, Money, and Time Operations in the Malay version compared to the Temiar version. The findings also show that the bilingual version can improve the achievement of the Orang Asli students in the topics of Money and Time in math calculations and word problem items. [Ismail, Ching and Muda \(2020\)](#) discovered that most Orang Asli students face problems in solving word maths problems, which require literacy skills such as interpreting situations and using correct procedures. The reasons for the weakness could be due to reading and understanding problems.

[Ruef, Jacob, Walker and Beavert's \(2020\)](#) study is a preliminary work and the next step for the development of a mathematics curriculum in Ichishkíin, the Yakama indigenous language. Their study seeks to create new Ichishkíin words to express mathematical concepts that are not reflected in the Yakama culture. The study involves the creation of a language to reduce the gap of mathematical terms and concepts from English to Ichishkíin

and vice versa. The study begins with the main observation about the creation of a language to reflect mathematical concepts. The translation of mathematical terms and concepts into Ichishkíin from English requires time, patience and perseverance. The mathematical concepts are carefully discussed to clarify the meaning of the concepts and the culture before the translation is conducted. The concepts that are not clearly identified within the Yakama cultural framework are debated in terms of their meaning and how best to represent them in Ichishkíin. Before forming words in Ichishkíin, the researchers consider the mathematical concepts that involve the life experiences of the Yakama people. The results of the study benefit all indigenous students. The study indirectly respects the Yakama culture and the Ichishkíin language. All students benefit from the student-centered, concept-based content (AMTE, 2017).

Warren and Young, (2008) found that the learning conditions for the Orang Asli students in Malaysia are not in line with their needs when they enter the school. The mismatch between the Orang Asli language and the language used in the school directly affects the achievement of the Orang Asli students in numeracy in the long term (Warren & de Vries, 2009). Sullivan and van Riel (2013) indicate that the prevalence of direction words in some Orang Asli languages may imply that the learning of geometry may be closer to the Orang Asli students' experience as compared to the learning of number. Using this aspect in the curriculum will potentially build the Orang Asli students' confidence, success, and connection to mathematics and schooling. In this regard, Warren and de Vries (2009) put an emphasis on the role of an oral language in the teaching of mathematics because it can foster an important language acquisition and ultimately assist the Orang Asli students in acquiring meta-cognitive abilities.

Matang and Owens (2014) examine the influences of mother tongue (Tok Ples) and the traditional counting system on the development of early number knowledge that is formally taught in schools. In Malaysia, although the Orang Asli community is a minority group in a predominantly Malay-speaking society, they remain strong with their language and culture. According to Sa'adiah Ma'alip and Teo Kok Seong (2016), the use of a language that resembles the Orang Asli language, such as Che Wong, can empower the Orang Asli community in the education system. In the context of mathematics teaching and learning in Malaysia, the effectiveness of the use of the Orang Asli language is evident in the students' mathematics achievement, as shown by Veloo et al. (2021a) and Veloo et al. (2021b). Accordingly, language is one critical aspect that needs to be emphasised in the mathematics learning among the Orang Asli students.

5. Code-Switching in Mathematics Learning for Indigenous Students

Code-switching is a situation that occurs as a result of bilingualism or multilingualism, which is the use of two languages in the same conversation (Cook, 2001). Bilingual individuals usually switch their language in the middle of the same conversation. There are various reasons for code-switching. One of the reasons is the lack of appropriate terms, especially when one cannot find the appropriate vocabulary or the correct terms in both languages. Facilitating students' understanding and interest as well as reducing their tension in mathematics classes are some of the reasons why code-switching is practised. This situation is also sometimes caused by the differences in the exposure to the language of instruction between teachers and their students. This concept has been well researched because the language of instruction and the language of mathematics coexist. Moreover, there are opportunities to switch between languages to improve communication. This concept, if explored, will help bilingual students in learning mathematics.

Teaching mathematics using the medium of instruction that is unfamiliar among students still poses challenges to teachers. This has caused teachers to use code-switching in an effort to improve conceptual understanding and to access to mathematical terms. As code-switching is highly relevant in the Orang Asli schools in Malaysia and is recognised as a beneficial teaching and learning method, there is a need to identify and document best practices in the education context. Although there is a lack of code-switching materials in mathematics, existing materials can be used effectively. There is a great need for the production of more and better multilingual teaching resources in mathematics. The complex nature of teaching mathematics in multilingual classrooms makes the identification of code-switching materials for best teaching practices an important necessity.

Code-switching is an interactional practice in which proficient speakers switch from one language to another without interrupting the flow of ideas. A previous study by [Setati and Adler \(2000\)](#) on language practices in multilingual mathematics classrooms in South Africa shows that code-switching is a pedagogical practice used by teachers to encourage students' participation. According to [Clegg and Afitska \(2011\)](#), teachers use code-switching to (1) explain concepts, (2) increase engagement in the classroom, (3) communicate affectively and socially with students, (4) maintain class unity that supports affective learning, (5) ensure smooth learning, (6) attract interest; and (7) make connections between the new conceptual materials and the students' local cultures.

According to [Schafer \(2010\)](#), South Africa is a multicultural and multilingual country with 11 official languages. Although the Language-in-Education Policy insists that the language of learning and teaching in the first four years of schooling should be the mother tongue, the use of code-switching is a common practice in most schools where the primary language of teachers and students is not English. In South African classrooms, code-switching usually involves indigenous languages and English. Although there is a policy stating that the medium of instruction should be changed to English after Grade 4, the practice of code-switching is often maintained throughout the schooling period. Code-switching can be an effective pedagogical tool to overcome language barriers for teaching and learning. As stated by [Setati and Adler \(2001\)](#), many teachers in South Africa have the dual task of teaching both mathematics and English.

7. Continuous Efforts to Enhance the Mastery of the National Language in Mathematics Learning among the Orang Asli Students

Communication using the medium of language is indispensable in mathematics classes across the world, including Malaysia. In the Primary School Standard Curriculum (KSSR) for the subject of mathematics in Malaysia, one of the objectives is to consistently practice mathematical process skills such as problem solving, reasoning, communicating mathematically, making connections and representations. Based on the explanation given by the [Ministry of Education \[MOE\] \(2013\)](#), mathematical communication is the process of expressing ideas and understanding verbally, visually or in writing using numbers, notation, symbols, diagrams, graphs, pictures or words. Communication is an important process in learning mathematics because mathematical communication helps students explain and strengthen their understanding in mathematics. Through communication, mathematical ideas can be expressed and understood in a better way. Mathematical communication (verbal, written, using symbols and visual representations) can help students understand and apply mathematical concepts more effectively.

Teachers should be sensitive to the opportunities available during learning and teaching to encourage students to express and present their mathematical ideas through appropriate questioning techniques. Communication that involves various perspectives and various points of view can help students improve their understanding of mathematics while also increasing their self-confidence. An important aspect of mathematical communication is the ability to explain effectively, as well as to understand and apply mathematical notation correctly. Students need to use language and mathematical symbols correctly to ensure that a mathematical idea can be explained accurately. Effective communication requires an environment that is always sensitive to students' needs to feel comfortable when speaking, asking questions, answering questions, explaining statements and justifying views to classmates and teachers. Students need to be given the opportunity to communicate actively in various situations, such as communicating while doing activities in pairs, groups or giving explanations to the whole class.

Cross-Curriculum Elements (EMK) are value-added elements that are applied in the learning and teaching process of mathematics other than those specified in the content standards. These elements are applied to strengthen the desired human capital skills and abilities that enable students to deal with current and future challenges. One of the elements in EMK is language skills which include the use of correct basic terms in all subjects. During the process of learning and teaching mathematics, aspects of pronunciation, sentence structure, and grammar need to be emphasised in order to help students organise ideas and communicate effectively.

The Upholding the Malay Language and Strengthening the English Language Policy (MBMMBI), implemented in 2011, shows the government's earnest efforts to elevate the position of the Malay language, as enshrined in the Malaysian Constitution. This policy was introduced to replace the Science and Mathematics Teaching and Learning Policy in English (PPSMI), which was discontinued. Through MBMMBI, three benefits can be achieved. First, the policy aims to produce Malaysian citizens who are fluent and confident to use standard Malay in conversation, official business, knowledge exploration, and in the field according to suitability and need. Second, the policy can build human capital that is able to access various fields of knowledge through various media such as information communication technology (ICT), thus boosting a critical, creative and innovative mind. Third, the policy can form Malaysians who have a strong, progressive, dynamic identity, thus enabling them to compete at the international level towards achieving a developed country.

From the discussion above, it is clear that in Malaysia, the medium of learning in schools, including mathematics classes, is the Malay language. However, the Malaysian Education Development Plan (PPPM) 2013-2025 under Initiative 57: Transformation of Indigenous and Indigenous Education was introduced to ensure equity. That is, equal access to education for the Orang Asli students along with mainstream education should be realised with the earnestness and commitment of all parties. The Day School Management Division also pays attention to the pedagogy of teaching and learning for the Orang Asli students that is suitable for the environment of the Orang Asli community by providing this guide to teachers in the Orang Asli schools. Accordingly, several initiatives have been implemented in order to address the issues raised by local researchers. Among them are the formation and development of a contextual curriculum, namely the Indigenous and Penan Curriculum (KAP) adapted for the Orang Asli and Penan students, the application

of indigenous and minority languages in the curriculum, and the preparation of the Orang Asli Penan/Peribumi Adult Class Programme (KEDAP).

The results of a study by [Shaari, Yusoff, Ghazali and Dali \(2016\)](#) on the Orang Asli students in Cameron Highlands, Pahang, reveal that the students use the Semai language as the language of communication at school. This situation leads to their problems in Malay literacy. The socio-cultural factors also play a role in improving the literacy skills of the Orang Asli students. Therefore, teachers need to modify their teaching styles to suit the needs and cognitive abilities of the Orang Asli students. In addition, according to [Nazirah Mohd Nordin \(2010\)](#), there is a gap in the knowledge of the Malay language between the Malay and non-Malay students. This is one of the main causes of literacy problems among non-Malay students, such as the Orang Asli students, who are only exposed to the Malay language when they start formal education in kindergarten or preschool. Non-Malay students, especially the Orang Asli students, experience difficulties in mastering the Malay language literacy due to geographical factors, among which is less contact and communication with outside communities, especially the Malays ([Shaari et al., 2016](#)).

Teacher quality is often cited as a significant factor in student learning ([Jamaludin & Rosli, 2021](#)). Many teachers in remote indigenous schools are young and inexperienced ([Jorgensen \(Zevenbergen\) et al., 2010](#)). As these teachers lack experience, their potential to become skilled teachers has yet to be realised. The low achievement of students in indigenous schools is partly due to the lack of mastery among teachers. However, as stated by [Gutierrez \(2013\)](#), a highly skilled teacher depends on the students being taught and the context in which one is teaching. When teachers and students cannot share a language or teachers are not trained in methodologies involving the students' native languages, the ability to use effective oral communication strategies cannot be achieved. Accordingly, in Malaysia, in order to reduce educational problems among the Orang Asli students, the Malaysian Ministry of Education has implemented an initiative through the Teacher Education Institute (IPG). The Salinatan Model Pensiangan project was launched in 2004 with the aim of improving the content knowledge pedagogy (PCK) and the quality native pedagogy skills among teachers who teach in the Orang Asli schools. This effort is expected to improve the academic performance of the Orang Asli students ([Asariah, 2009](#)).

In addition, the Orang Asli Penan/Peribumi Adult Class Programme (KEDAP) was introduced in 2008 with the aim of reducing the illiteracy rate among the Orang Asli and Penan communities throughout Malaysia. Through the implementation of initiatives contained in this programme, the Orang Asli and Penan community can master the literacy and numeracy and form a positive attitude towards lifelong education regardless of gender or background. The programme aims to improve the Penan communities' mastery of the basic skills of reading, writing and counting, and to help their children in learning. The Malaysian Ministry of Education has started KEDAP KPM, which was later renamed as the Adult Classes for Parents of Orang Asli and Peribumi Students, aiming to provide literacy education to the parents of the Orang Asli students ([Kementerian Pelajaran Malaysia, 2008](#)). In addition, under the initiative of the Department of Orang Asli Development (JAKOA), the Orang Asli adult education has been further expanded with the implementation of two adult Orang Asli education programmes, namely the Skill and Career Training Programme (PLKK), which started in 2009, and the Indigenous Orang Asli Adult Class Programme (KEDAP JAKOA), which started in 2013 ([JAKOA, 2013](#)).

In another study, [Saleh and Mustapha \(2016\)](#) evaluate the effectiveness of the KEDAP programme by using a programme evaluation method. The data was obtained through

questionnaires. For the MOE KEDAP programme, the respondents consisted of 136 management personnel, while for the JAKOA KEDAP programme, the respondents consisted of 36 management personnel. The findings reveal that both programmes were implemented effectively. The study also found that the input aspects of the programme (planning, curriculum, teacher training, facilities, dissemination of information and financial resources) and the output aspects of the programme (teaching process, teaching methods and learning methods) have a significant relationship with the outcome aspects of the programme. In addition, the study also found that the teaching process, student-centred teaching methods, planning and implementation, teacher training and financial resources are the determining factors for improving the outcome aspects of the MOE KEDAP programme. Besides, the curriculum aspect and student-centred learning methods are the determining factors for improving the outcome aspects of the JAKOA KEDAP programme. Overall, based on the findings of the study conducted, both of these KEDAP programmes should continue to be implemented as they have been run effectively and the adult Orang Asli students have successfully acquired the knowledge and skills to read, write and count.

The MOE revised the Orang Asli and Penan Curriculum (KAP) starting in late 2017 to 2018. The newly revised module was renamed PIKAP ([Ministry of Education Malaysia, 2018](#)). Similar to KAP, PIKAP aims to improve the basic literacy and numeracy skills of the Orang Asli and Peribumi students with the inclusion of three additional subjects (Malay, English, and mathematics). PIKAP involves three main subjects at Level 1, namely Malay, English and mathematics which contain learning modules adapted to the context of the environment. It is hoped that these efforts can increase the interest of the Orang Asli and Peribumi students in learning and attending the school.

It may not be realistic for every teacher to meet the needs of the Orang Asli students related to language, culture and identity. However, much can be done to help teachers feel more confident and competent in creating positive relationships with the Orang Asli students. Teachers are sometimes unaware of the assumptions they make about their students, especially if there is a cultural or language difference between them and their students. However, such assumptions can change when teachers become aware of their biases, including their impact on their students. Teaching can also be improved through the selection of learning activities, curriculum content and assessment mechanisms. A very simple step for schools to take is to provide and use books and other resources developed by the Orang Asli communities themselves. For example, some contemporary texts developed by indigenous authors can be integrated as curriculum resources. This can be used in a variety of ways to make learning more relevant and engaging for the Orang Asli students and to build their confidence and competence.

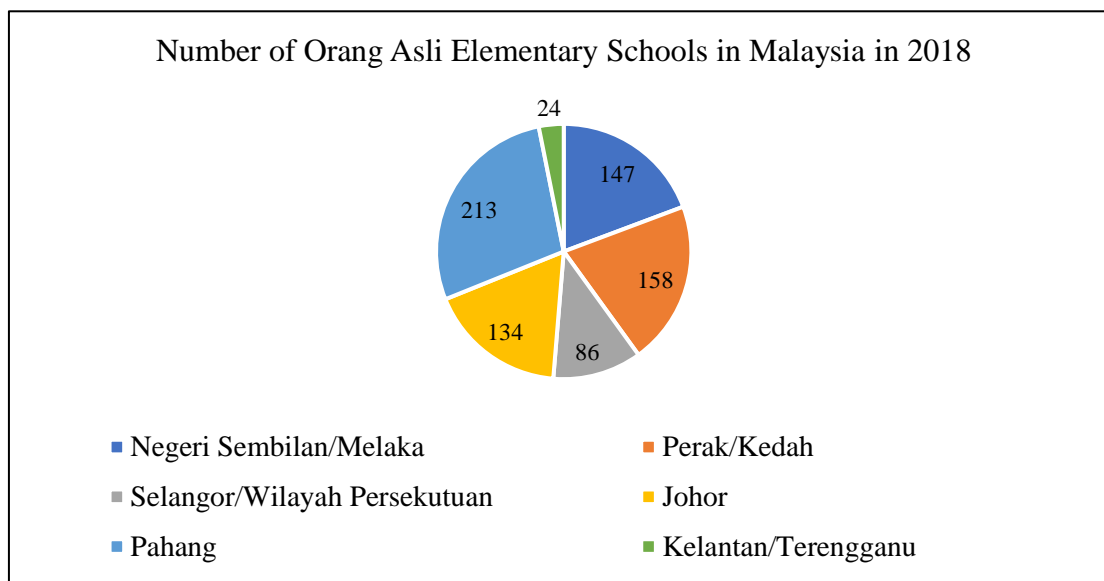
Many initiatives taken by the government, especially the Ministry of Education, show the government's determination to help and improve the standard of living of the Orang Asli communities through quality education, in line with the progress experienced by all communities in Malaysia. However, this pure initiative can only be materialised if there is support and cooperation from all parties who implement the initiative. If there is no support and integrity among the executives, the programmes may not have any impact on the target group. Therefore, it is crucial that all parties are willing to implement the desired programmes for the sake of the Orang Asli communities' wellbeings.

8. Conclusion

The early years lay the groundwork for children's mathematical development, based on the Principles and Standards for School Mathematics (Seefeldt & Wasik, 2006). However, according to Fischetti (2013), many students go through difficult experiences in learning mathematics due to unclear teaching methods at school. The importance of mathematical concepts, particularly in the early school years, has been highlighted by researchers, professional organisations, and mathematics education standards (Blum & Borromeo Ferri, 2009; The National Council of Teachers of Mathematics (NCTM), 2000). Language has also been identified as one of the factors in the failure among the Orang Asli students in Malaysia in mathematics at the primary school level.

The number of Orang Asli primary schools in Malaysia is depicted in Figure 2, along with the number of Orang Asli primary school students by gender and state in Figure 3. Figure 2 shows that there are 762 Orang Asli students in the elementary schools in Malaysia, whereas Figure 3 shows that there are 27,224 Orang Asli students in the primary schools in Malaysia in 2018, with 13,600 female students and 13,624 male students. Accordingly, efforts need to be made, especially with regard to the language used in mathematics classes, to ensure that the Orang Asli students do not fall behind in the academic field. Although Malay is the official language in Malaysia, the Orang Asli communities have the freedom to speak and practise their own languages. In fact, the Orang Asli children can exercise their language, declare their faith, or enjoy their own culture.

Figure 2: Number of Orang Asli Elementary Schools by State in Malaysia in 2018

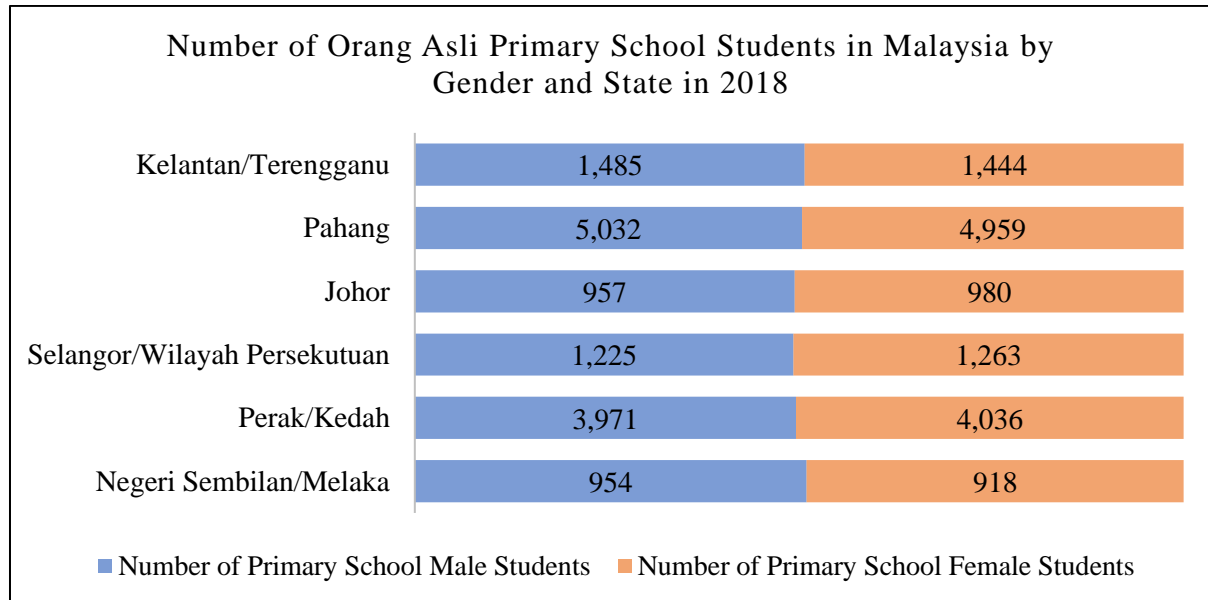


Source: Department of Orang Asli Development (JAKOA) (2022)

According to SUHAKAM (2010), the Ministry of Education should consider the use of the Orang Asli languages if the situation permits, especially in the early stages of schooling. This is highly recommended to ensure that the Orang Asli students do not face communication problems, particularly in mathematics classes. As mentioned earlier, the effectiveness of using the Orang Asli language is evident in the students' mathematical achievements. However, when the students are able to understand the Malay language, teaching and learning should be carried out entirely in Malay. As stated in Article 152 of the Federal Constitution, the Malay language, also known as Bahasa Malaysia, is the official

language in Malaysia and, therefore, all Malaysians need to respect it. In this context, teachers need to be more creative in ensuring effective strategies in mathematics teaching and learning for the Orang Asli students.

Figure 3: Number of Orang Asli Primary School Students in Malaysia by Gender and State in 2018



Source: [Department of Orang Asli Development \(JAKOA\) \(2022\)](#)

One of the effective approaches in mathematics teaching and learning is code-switching. This approach has been widely practiced in many countries in the African continent. Teachers usually use code-switching as a way to incorporate the students' first language in the teaching and learning process. It is impractical to exclude the students' first language as it may hinder their understanding in important mathematical concepts. Most studies on code-switching in mathematics classes show that the use of students' primary language is a necessary support to develop students' competence. Nevertheless, clear teacher code-switching guidelines should be developed and implemented in the classroom. In addition, continuous efforts from various parties should also be encouraged to improve the quality of education among the Orang Asli students in Malaysia, especially in increasing the use of the national language.

Acknowledgement

Part of this article was contributed by report from Department of Orang Asli Development (JAKOA).

Funding

This work was supported by the Ministry of Higher Education under Fundamental Research Grant Scheme (FRGS/1/2022/SSI01/UTM/02/1)

Conflict of Interest

The authors declare no conflicts of interest.

References

- Asariah Mior Shaharuddin. (2009). Quality teachers for quality education. *17th Conference of Commonwealth Ministers of Education (17th CCEM)*, Kuala Lumpur Convention Centre.
- Association of Mathematics Teacher Educators [AMTE]. (2017). Standards for preparing teachers of mathematics. *Association of Mathematics Teacher Educators*. <https://amte.net/standards>
- Benjamin, A. (2009). *Indigenous People and The Law: Comparative and Cultural Perspectives*. Osgood Readers.
- Blum, W., & Borromeo Ferri, R. (2009). Mathematical modelling: Can it be taught and learnt? *Journal of Mathematical Modelling and Application*, 1, 45-58.
- Clegg, J., & Afitska, O. (2011). Teaching and learning in two languages in African classrooms. *Comparative Education*, 47(1), 61-77. <https://doi.org/10.1080/03050068.2011.541677>
- Cook, V. (2001). *Second Language Learning and Language Teaching*. New York: Oxford University Press.
- Department of Orang Asli Development (JAKOA). Available online: *JAKOA* <https://www.jakoa.gov.my/orang-asli> (accessed on 13 May 2022).
- Eberhard, D. M., Simons, G. F., & Fennig, C. D. (2019). *Ethnologue: Languages of Asia*. Dallas, Texas: SIL International.
- Fischetti, J.C. (2013). *Issues in education: Last stand for teacher education*. *Childhood Education*. 89(1):40-41.
- Garcia, O., Bartlett, L., & Kleifgen, J. A. (2007). From biliteracy to pluriliteracies. *Handbook of Multilingualism and Multilingual Communication*, 207-228. <https://doi.org/10.1515/9783110198553.2.207>
- González Garca, M. I. (2010). The many roads to risk communication in Spain. *Catalan Journal of Communication & Cultural Studies*, 2(2), 277-285.
- Gutiérrez, R. (2013). Why (urban) mathematics teachers need political knowledge. *Journal of Urban Mathematics Education*, 6(2), 7-19.
- Hamzah, M. H., Halim, H. A., Bakri, M. H. U. A. B., & Pillai, S. (2022). Linguistic research on the Orang Asli languages in Peninsular Malaysia. *Journal of Language and Linguistic Studies*, 18(2), 1270-1288.
- Ismail, Z., Ching, T. Y., & Muda, N. A. (2020). Numeracy Competency of Year 5 Aboriginal Students Using Written and Oral Tests. *The Mathematics Enthusiast*, 17(1), 32-62.
- Jabatan Kemajuan Orang Asli (JAKOA) (2013) *Kertas Projek Program Latihan Kemahiran dan Kerjaya Masyarakat Orang Asli Tahun 2013*. Kuala Lumpur: JAKOA.
- Jorgensen (Zevenbergen), R., Grootenboer, P., Niesche, R., & Lerman, S. (2010). Challenges for teacher education: The mismatch between beliefs and practice in remote indigenous contexts. *Asia-Pacific Journal of Teacher Education*, 38(2), 161-175. <https://doi.org/10.1080/13598661003677580>
- Kementerian Pelajaran Malaysia (2008) *Kurikulum Kelas Dewasa Asli Penan*. Putrajaya
- Matang, R.A.S.; Owens, K. (2014). The role of indigenous traditional counting systems in children's development of numerical cognition: Results from a study in Papua New Guinea. *Math. Educ. Res. J.*, 26, 531-553
- Md Nor, S., Roslan, S., Mohamed, A., Hassan, K. A., Mat Ali, M. A. (2016). Dropout prevention initiatives for Malaysian indigenous orang asli children. *International Journal on School Disaffection*, 8(1), 42-56. <https://doi.org/10.18546/ijds.08.1.07>
- Md-Ali, R., Veloo, A., Shanmugam, S., Yusoff, Y. A. J., & Awang Hashim, R. (2021). The Issues and Challenges of Mathematics Teaching and Learning in Malaysia" Orang Asli"

- Primary Schools from Teachers' Perspectives. *Malaysian Journal of Learning and Instruction*, 18(2), 129-160.
- Ministry of Education [MOE]. (2013). *Primary School Standard Curriculum: Curriculum and Assessment Standard Document, Mathematics Year Four*. Curriculum Development Centre, Putrajaya.
- Ministry of Education Malaysia [MOE]. (2018). *Malaysia Education Blueprint 2013–2025: 2017 Annual Report*. Putrajaya: Ministry of Education Malaysia. <https://www.padu.edu.my/wp-content/uploads/2018/07/AR2017-English-PPPM-.pdf>.
- Nazirah Mohd Nordin (2010) *Tahap Penguasaan Penulisan Bahasa Melayu Dalam Kalangan Murid Orang Asli di Daerah Hulu Langat, Malaysia*. [PhD thesis, Universiti Putra Malaysia].
- Nordin, N. A., & Wahab, N. A. (2021). Kertas Konsep Pembangunan Modul Sekolah Rimba Berasaskan Pengetahuan Peribumi Bagi Mengekalkan Kelestarian Masyarakat Orang Asli. *Asian Pendidikan*, 1(1), 10-21.
- Norwaliza Abdul Wahab & Ramlee Mustapha (2015). Reflections on Pedagogical and Curriculum Implementation at Orang Asli Schools in Pahang. *Procedia -Social and Behavioral Sciences*, 172, 442–448. <https://doi.org/10.1016/j.sbspro.2015.01.376>
- Omar, A. H. (2014). Processing Malaysian Indigenous Languages: A Focus on Phonology and Grammar. *Open Journal of Modern Linguistics*, 4, 728-738. <http://dx.doi.org/10.4236/ojml.2014.45063>
- Jamaludin, S., & Rosli, R. (2021). Pembangunan profesionalisme guru matematik Sekolah Rendah: Kajian Literatur Bersistematik. *Malaysian Journal of Social Sciences and Humanities (MJSSH)*, 6(8), 224–235. <https://doi.org/10.47405/mjssh.v6i8.912>
- Ruef, J. L., Jacob, M. M., Walker, G. K., & Beavert, V. R. (2020). Why indigenous languages matter for mathematics education: a case study of Ichishkiiin. *Educational Studies in Mathematics*, 104(3), 313-332
- Sa'adiah Ma'alip & Teo Kok Seong. 2016. Penggunaan bahasa Orang Asli Che Wong di Kuala Gandah. *GEOGRAFIA Online Malaysia Journal of Society and Space*, 12(11), 62-78.
- Saleh, H. M., & Mustapha, R. (2016). Keberkesanan Program Kedap Kpm Dan Kedap Jakoa Dari Perspektif Pengurusan Program: Satu Perbandingan. *Journal of Techno-Social*, 8(1).
- Sani, N.; Idris, A.R. (2017). Identifying the challenges encountered by teachers in dealing with indigenous students. *MOJEM Malays. Online Journal of Educational Management*, 1, 48–63. Available online: <https://sare.um.edu.my/index.php/MOJEM/article/view/6173/3877> (accessed on 18 October 2017).
- Schafer, M. (2010). Mathematics registers in indigenous languages: Experiences from South Africa. *Proceedings of the 33rd Annual Conference of the Mathematics Education Research Group of Australasia*. Fremantle: MERGA., 509–514.
- Seefeldt, C., & Wasik, B.A. (2006). *Early education: three-, four-, and five-year-olds go to School (2nd ed.)*. Upper Saddle River: Pearson Education.
- Setati, M., & Adler, J. (2000). Between languages and discourses: Language practices in primary multilingual mathematics classrooms in South Africa. *Educational studies in mathematics*, 43(3), 243-269.
- Shaari, A. S., Yusoff, N., Ghazali, M. I., & Dali, M. H. (2016). Kanak-kanak minoriti Orang Asli di Malaysia: menggapai literasi bahasa Melayu. *Jurnal Pendidikan Bahasa Melayu*, 1(2), 59-70.
- SUHAKAM. (2010). *Laporan status hak pendidikan kanak-kanak Orang Asli*. Kuala Lumpur: SUHAKAM.

- Sullivan, P. & van Riel, N. (2013) Building confidence and fostering engagement in Aboriginal learners. In *Pedagogies to Enhance Learning for Indigenous Students*; Jorgensen, R., Sullivan, P., Grootenboer, P., Eds.; Springer: Singapore, 2013; pp. 139–153.
- Talib, J., & Muslim, N. (2007). Bagaimana kanak-kanak Orang Asli gagal di sekolah?. *MALIM: Jurnal Pengajian Umum Asia Tenggara*, 8, 51-76.
- The Malaysian Insight Report. (2020). PPSMI perjudi masa depan anak luar bandar. *The Malaysian Insight Report*
https://www.themalaysianinsight.com/bahasa/s/216283?utm_source=dlvr.it&utm_medium=facebook
- The National Council of Teachers of Mathematics. (2000). *Principles and Standards for School Mathematics*. Reston, VA: The National Council of Teachers of Mathematics, Inc.
- Veloo, A., Shanmugam, S. K. S., Md-Ali, R., Yusoff, Y. A. J., & Awang-Hashim, R. (2021a). Grade five Indigenous (Orang Asli) pupil's achievement in bilingual versions of mathematics test. *Journal of Language and Linguistic Studies*, 17(4), 1863-1872.
- Veloo, A., Shanmugam, S. K. S., Md-Ali, R., Yusoff, Y. A. J., & Awang-Hashim, R. (2021). Grade five Indigenous (Orang Asli) pupil's achievement in bilingual versions of mathematics test. *Journal of Language and Linguistic Studies*, 17(4), 1863-1872.
- Veloo, A., Suppiah Shanmugam, S. K., Md-Ali, R., Yusoff, Y. A. J., & Awang-Hashim, R. (2021b). Examining indigenous (Orang Asli) pupils' achievement in mathematics computation and word problem items. *Journal of Language and Linguistic Studies*, 17(3), 1290-1300.
- Warren, E. & de Vries E. (2009). Young Australian Indigenous Students' engagement with numeracy: Actions that assist to bridge the gap. *Australian Journal of Education*, 53(2), 159–175. <https://doi.org/10.1177/000494410905300205>
- Warren, E., & Young, J. (2008). Oral language, representations and Mathematical Understanding: Indigenous Australian students. *The Australian Journal of Indigenous Education*, 37(1), 130–137. <https://doi.org/10.1017/s1326011100016173>